General
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Suzanne Steab - Wildlife Buffer Team Meeting

From: Suzanne Steab
To: Bailey, Carmen; Bates, Bill; Bezzant, Gary; Bonebrake, Bruce; Bonzo,...
Date: 6/1/2010 11:32 AM
Subject: Wildlife Buffer Team Meeting
CC: Daron Haddock; Ingrid Wieser; Jim Smith; Joe Helfrich
Attachments: RaptorSurveyProtocol.pdf; REVISEDTech-009Wildlife Exclusionary Periods.pdf; FinalCo Fish FWSProtocol.pdf; WBTMemo.pdf

Attached is a Memo giving details of the upcoming Wildlife Buffer Team Meeting scheduled for June 15, 2010 from 9:00 a.m. to Noon at the Price Field Office.

Also attached are documents which will be addressed at the meeting.

If you have any questions or comments in the interim, please email or call Joe Helfrich at (801) 538-5290 joehelfrich@utah.gov or Ingrid Weiser at (801) 538-5318 ingridweiser@utah.gov.

We look forward to seeing you. Thanks.

Subject: Wildlife Buffer Team Meeting
Created By: SUZANNESTEAB@utah.gov
Scheduled Date:
Creation Date: 6/1/2010 11:32 AM
From: Suzanne Steab

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Attachments: Wildlife Buffer Team Meeting

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Subject: Fwd: Wildlife Buffer Team Meeting
Attachments: Wildlife Buffer Team Meeting

JON M. HUNTSMAN, JR.
Governor
GARY R. HERBERT
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
Division of Oil, Gas & Mining

MICHAEL R. STYLER
Executive Director
JOHN R. BAZA
Division Director

June 1, 2010

TO: Wildlife Buffer Team Meeting Attendees

FROM: Daron R. Haddock, Coal Program Manager

SUBJECT: Colorado Fish Recovery, Raptor Survey Protocol and Wildlife Protection and Enhancement guidance documents, Outgoing File

The Division has completed an internal review of the Colorado Fish Recovery, Raptor Survey Protocol and Wildlife Protection and Enhancement guidance documents. Representatives from the Bureau of Land Management, (BLM), Forest Service, (FS), US Fish and Wildlife Service, (FWS), Division of Wildlife Resources, (DWR), and School and Institutional Trust Lands, (SITLA) also participated in the review as members of the Wildlife Buffer Team.

These documents are guidance documents designed to assist the Division, State and Federal Agencies, members of the Mining communities and private industry in addressing the requirements of the Utah Coal Regulatory Program

You are invited to attend the Wildlife Buffer Team meeting on Tuesday, June 15th, 2010 at the DNR Price Field Office from 9:00 Am to 12:00 PM. The meeting is intended to solicit your input about the Colorado Fish Recovery guidance document, and time permitting the Raptor Survey Protocol and Wildlife Protection and Enhancement guidance documents. Kevin McAbee from the FWS and Joe Helfrich and Steve Christensen from DOGM will provide a brief overview of the Colorado Fish Recovery guidance document.

In the interim please email or direct your questions and comments to Joe Helfrich, (801 538-5290, joehelfrich@utah.gov) or Ingrid Wieser, (801 538-5318, ingridwieser@utah.gov). Please let us know if you plan on attending.

We look forward to your participation.

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RAPTOR SURVEY GUIDELINES
Utah Coal Regulatory Program

Purpose

The purpose of this document is to:

A) Provide the coal industries with a guideline for conducting raptor surveys,
B) Ensure accurate and consistent data acquisition and reporting, and
C) When completed and endorsed by other agencies used as an Agency Procedure

This is a cooperative document between the Division of Oil, Gas and Mining, the Division of Wildlife Resources and the U.S. Fish and Wildlife Service. This is a working document in which the procedures will be refined and updated as needed.

Background

The Bald and Golden Eagle Protection Act prohibits the "take" of bald and golden eagles. The Act defines "take" to mean kill, molest or disturb. "Disturb[1] means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior" (50 CFR 22.3). A violation of the Act can result in a fine of $100,000 ($200,000 for organizations), imprisonment for one year, or both, for a first offense. Penalties increase substantially for additional offenses, and a second violation of this Act is a felony.

The Migratory Bird Treaty Act implements four bilateral agreements between the United States and Canada, Mexico, Japan and Russia to protect migratory birds. This Act also prohibits the unlawful taking of migratory birds, which includes any attempt at hunting, pursuing, wounding, killing, possessing or transporting any migratory bird, nest, egg, or part thereof. Most birds in Utah are protected by the Act as well as their parts, nests, or eggs. All of Utah's raptors are protected by this Act.

Utah law also protects wildlife existing within the state, except those held by private ownership and legally acquired (Utah Code Section 23-13-3). Sections 23-30-3, 23-20-4

[1] The term "disturb" under the Eagle Act was recently defined via a final rule published in the Federal Register on June 5, 2007 (72 Fed. Reg. 31332). This term now covers impacts that result from alterations that were started near a nest site during a time when eagles are not present if, upon the eagle's return, those alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and cause injury, death or nest abandonment

and 23-20-4.5 make illegal the taking, transporting, selling, purchasing or wanton destruction of protected wildlife.

The Utah Administrative Code Annotated (R645-301-358.300) states that coal mining and reclamation operations are prohibited from the taking of an endangered or threatened species or a bald or golden eagle, its nest, or any of its eggs in violation of the Endangered Species Act of 1973 or the Bald Eagle Protection Act, as amended, 16 U.S.C. 668 et seq. The coal mine operator must avoid and minimize disturbance and adverse impacts to wildlife species protected by state or federal law and describe in the mining and reclamation plan how this will be accomplished (R645-301-333).

Coal Mines have the potential to "take" eagles or other migratory bird species in several ways including direct or indirect disturbances to their nest, roosts, or food sources resulting from mining related disturbances due to:

- Subsidence;
- Surface facilities;
- Exploration drilling; or
- Gas or ventilation holes or openings.

In order to prevent the "take" of eagles and other raptor species in past years the mines in conjunction with DWR have typically conducted annual helicopter surveys. The Division of Oil, Gas and Mining (DOGM) has accepted those surveys, as adequately addressing raptor survey needs. Even though The Division of Wildlife Resources (DWR) is no longer conducting surveys, the mines are still required to provide the necessary information to demonstrate a "take" is being prevented. This document is meant only as a guideline; prior to conducting surveys, a DOGM biologist should be contacted to discuss specific project details. Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances (Romin and Muck 2002) guidelines are incorporated into these suggested procedures.

General Survey Guidelines

Survey methodology should be designed to inventory the species expected within the habitat to be disturbed. Aerial or ground survey methodologies target different raptor species and are used to collect different types of data. Appendix C lists recommended survey methodologies and typical nesting substrates for specific raptor species. Most coal operators are interested in nest locations and presence/absence data during the nesting season. Survey methodology should be designed by a qualified raptor biologist and reviewed on a case-by-case basis with DOGM in coordination with DWR, the US Fish and Wildlife Service (FWS), and the surface land management agency. Survey methods will be incorporated into the mining and reclamation plan. To be consistent with State AGRC standards, coordinates should be provided in UTM zone 12, NAD83.

Subsidence

Raptor surveys should be conducted to identify nest locations in areas where subsidence is possible. Aerial surveys are typically conducted.

1. Conduct survey for two years prior to permit issuance to determine resource.
2. Repeat surveys in subsidence zones prior to mining and then again two years post mining or until subsidence has ceased to verify no impact.
3. Surveys are best performed in May to determine nest status.
4. Survey information required,
    i.) Species
    ii.) Nest location
    iii.) Nest status (active, inactive, tended, dilapidated…)
    iv.) Additional information as shown in Appendix A is desirable but not required.
5. Raptor data are confidential and should not be shared with the public. The data must be submitted to DOGM and DWR. In the future, the data may be directly entered into an online database.
    i) In an electronic format, suitable for uploading into ArcGIS (shapefiles).
    ii) In a map format showing mine panels, subsidence boundary, dates of anticipated or completed mining activity, and nest locations indicating species, activity etc.

Surface facilities

Raptor surveys[2] for long-term surface facilities placement should be conducted to identify species, locate nests, winter roosts, and other important habitat so they can be avoided.

1. Conduct spring nesting and winter roosting surveys for three years prior to permit issuance to determine resource.
2. Survey within the spatial buffer of the target species (refer to Romin and Muck, 2002) at the proposed facility.
3. Nesting surveys are best performed in May to determine nest status.
4. Bald Eagle Roost surveys should be conducted in January within winter roosting habitat.
5. Survey information required
    i) Species
    ii) Nest location
    iii) Bald Eagle Roost location
    iv) Nest status (active, inactive dilapidated…)
    v) Additional information as shown in Appendix A.
6. The initial survey should be an aerial and ground survey; however, this will depend on terrain of proposed facilities and raptor species targeted. Follow-up surveys may be ground if the status of the nest can be accurately determined.

[2] A prey-based survey may also be required, especially if applying for an incidental take permit.

7. A qualified wildlife biologist should be retained to annually inventory and document raptor nesting and winter roosting status within the one-mile disturbance radius.
8. If a surface facility is inactive before the site is reclaimed another survey will be required prior to the start of reclamation activities. These surveys should include the surface structures such as conveyors and buildings as well as surrounding terrain.

Exploration drilling

Exploration drilling is generally a one-time short duration occurrence. The surface management agency needs to be contacted for specific survey requirements and to determine if existing data are available. If nest locations are known aerial or ground surveys can verify nest status so that appropriate spatial and season buffers can be determined. Generally, plan exploration drilling between August and November to avoid seasonal buffers.

Gas or Ventilation Holes or Openings

1. Conduct spring and winter surveys for one year prior to permit issuance to determine resource.
2. Survey within the spatial buffer of the target species (refer to Romin and Muck, 2002) at the proposed facility.
3. Nest surveys are best performed in May to determine nest status.
4. Bald Eagle Roost surveys should be conducted in January within winter roosting habitat.
5. A prey-based survey may also be required.
6. Survey information required
   i) Species
   ii) Nest location
   iii) Bald Eagle Roost location
   iv) Nest status (active, inactive dilapidated…)
   v) Additional information as shown in Appendix A.
7. The initial survey should be an aerial and ground; however this will depend on terrain of proposed facilities and raptor species potentially present. Follow-up surveys may be ground if the status of the nest can be accurately determined.
8. A qualified wildlife biologist should be retained to annually inventory and document raptor nesting and winter roosting status within the one-mile disturbance radius.

Protocol

The following protocol has been developed in consultation with DOGM, DWR and FWS.

Qualifications: Individuals responsible for designing and conducting the survey should have a Bachelor or higher degree in Wildlife Biology or a related discipline and experience in raptor behavior and excellent raptor identification skills. The act of surveying has the potential to disturb or molest the species surveyed and the qualified biologist will be responsible to prevent "take" during the survey. Safety of the surveyors and the birds are more important than obtaining all of the data attributes. All surveyors must attend the Utah Raptor Identification and Survey training, held annually by the US Fish and Wildlife Service. (For more information please contact the Division of Oil, Gas and Mining.) Qualified individuals should have a good working knowledge of GIS and GPS tools. Qualification statements or resumes must be submitted to DOGM prior to the survey.

Aerial Surveys

Golden Eagle and cliff nesting raptor surveys need to be initiated as close to May 10 as possible. This date will prevent "take" since eagle chicks have generally hatched and parent birds are less likely to abandon the nest. Surveys need to be completed by June 1 to ensure that the chicks are young enough that they will not be prematurely flushed from the nest by the disturbance.

Survey participants for aerial surveys historically included four members: the pilot, a company representative (scribe), a navigator, and a spotter/identifier (biologist). At least three people should be present. The navigator and spotter need to be qualified individuals as noted in the previous section of this document who can properly identify raptor species.

It is recommended that the navigator use moving-map type GPS technology to navigate during the survey to ensure adequate coverage of the survey area, navigate and identify known nests, and accurately record the location of newly discovered nests. Software that has been proven effective for these types of surveys include: ArcPad, Fugawi, Xmap, and National Geographic Map. These programs should show a topological map of the area, the surveyor's real-time location on the map, the locations of the known raptor nests and the track that the survey has covered.

The spotter/identifier finds new nests and birds; and assists in finding the known nest as the navigator explains its location on the computer. Once the nest is located, the spotter/identifier confirms the species, determines nest status and other information using the terms and data fields listed on the attached tables.

The company representative or scribe ensures that the area within 1mile of the affected or potentially impacted area is thoroughly surveyed. The scribe records the information

listed on the attached table, i.e. nest number, date, time, species, status of the nest, nest type (i.e. cliff, tree…), number of eggs, number of young, age of young, and any additional comments that are deemed necessary, preferably in an electronic format on the GPS.

For active territories, the surveyor(s) must conduct a second survey to gather productivity data. The productivity survey should be conducted when the young have reached acceptable fledging age (51 days old) but have not yet left the nest. All nests in which occupancy or breeding status could not be collected during the presence/absence survey should be revisited at this time. The surveyor(s) must analyze the productivity data by calculating the percent of eagle pairs laying eggs.

GPS track logs should be recorded and submitted to DOGM as well as photographs of the nest. When a new nest not in the database is found, a point of that nest should be taken with a GPS handheld, or the Trimble Laser Pointer. At a minimum, latitude and longitude coordinates must be submitted to DOGM. Each new nest will be assigned an original nest ID # given by DWR.

Ground Surveys

Ground surveys generally target tree and ground nesting species and are used when there is adequate road access. Some species, including Northern Goshawk, Mexican Spotted Owl and Burrowing Owl, require a ground or calling survey. When used to inventory remote or cliff habitat they generally require more time than aerial surveys. Surveyors must obtain a permit from FWS before surveying for Mexican Spotted Owls

Survey methodology should be designed by a qualified raptor biologist and reviewed on a case-by-case basis with DOGM in coordination with DWR, the US Fish and Wildlife Service (FWS), and the surface land management agency. Ground surveys require all data collection as described in the aerial survey.

Species Specific Surveys

See Appendix B for a list of protocols.

Data Collection and Formatting

Surveyors must obtain existing survey data prior to conducting aerial or ground surveys. This information can be obtained by contacting DWR at 801 538 5700 and filling out the requisite release forms. In addition, the applicant needs to contact the Division to verify the necessary location and extent of the survey. This will assist in locating known nests and so that unique identifying numbers can be assigned to new nests.

After field data has been collected all GPS tracks need to be downloaded into separate company or mine files, and all collected nest data needs to be added to the master database.

After all newly collected data and new nest information has been entered into the master database, the data should be imported into ArcGIS and saved as a shapefile or other compatible geospatial file.

Survey data are confidential and should not be shared with the public. The data must be submitted to DOGM in the following formats.

1. In an electronic format, suitable for uploading into ArcGIS.
2. A report with photographs and a map format showing all surface facilities and pertinent raptor use area, an appropriate size buffer (.25-1 mile depending on species), nests indicating species and status.

BIBLIOGRAPHY

Pagel, J.E., D.M. Whittington, and G.T. Allen. 2010. Interim Golden Eagle technical guidance: inventory and monitoring protocols; and other recommendations in support of eagle management and permit issuance. Division of Migratory Bird Management, U.S. Fish and Wildlife Service.

Romin, L.A. and J.A. Muck. 2002. Utah Field Office guidelines for raptor protection from human and land use disturbances. U.S. Fish and Wildlife Service unpublished report.

APPENDIX A
RAPTOR SURVEY FORM

RAPTOR SURVEY FORM

Division of Oil Gas and Mining
Coal Regulatory Program

Instructions:

Complete the following form including as much information as possible. This form is to be used for hand entry if direct electronic data entry is not possible. All data collected with this form must be submitted to the Division in an electronic format suitable for uploading into ArcGIS. Only nest status information should be collected aerially. All other data can be collected in a subsequent ground visit. Additional reporting requirements are located in the Raptor Survey Procedures provided by the Division of Oil, Gas and Mining.

1. Qualified Biologist: _____

2. Mine: _____

3. Survey Date: _____

4. Survey Type: (Check One)

- ☐ Aerial
- ☐ Ground (for tree or cliff nesting species)
- ☐ Ground (for ground nesting species)
- ☐ Calling

Nest Number or "NEW"	Species	Nest Status *(See Back)	Nest Condition *(See Back)	Number of Eggs in the nest:	Number of Young in nest	Age of young in nest (days)	Substrate *(See Back)	Productivity (# fledged)	Elevation/ Exposure of nest (optional)	Comments

BACK OF PAGE

NEST STATUS *

Active Active nest; a nest in which a breeding attempt was made as indicated by:
1) Eggs in nest, or
2) Young in nest, or
3) Fledged young near nest, or
4) Incubating/brooding adult

ActiveFail An active nest that did not fledge young, indicated by:
1) Egg shells in or around nest with no young when, young should be in the nest, or
2) Young present but known not to have fledged, or
3) Eggs in nest but obviously abandoned (past the time when eggs should have normally hatched).

Not Found: Did not locate; surveyor searched but was unable to locate the nest

Tended: Tended or Occupied; a nest with one or more of the following:
1) Fresh lining material;
2) Adult presence at or near the nest; and
3) Recent and well-used perch site near the nest.

TendedAL: Occupied Alternate; a tended nest within the boundaries of a territory housing an active nest.

Inactive: Inactive; a nest with no apparent recent use or adult presence at the time of observation, but in good condition.

Dilapidated: an inactive nest in a state of ruin due to weather, natural aging and/or neglect.

Destroyed: Inactive Destroyed; a nest showing no sign of raptor activity that is destroyed to the point that it is no longer usable without major reconstruction. These nests have disappeared, but there is often still lingering evidence of an historic presence.

Predated: Predated; the nest was active, but there is evidence that it was predated (remains of adults or young, feathers or egg shells scattered)

NEST CONDITION*

Gone: There may or may not be evidence of where the nest was, but it is no longer there.

Remnants: Scant material remaining and not usable unless fully rebuilt.

Poor: Nest is dilapidated, in need of major repair to be used.

Fair: Nest is not dilapidated, but needs significant repair in order to be used.

Good: Nest is in need of only minor attention in order for it to be used.

Excellent: Nest is able to be used with little or no attention or maintenance.

Unknown: The nest is obviously present (i.e., a tree cavity, rock cavity), but because of its location, a determination can not be made.

SUBSTRATE*

CAV:	Cavity
BLT:	Broadleaf tree
CLF:	Cliff/ Rock outcrop
CON:	Conifer
GHS:	Ground/Hillside
MMS:	Manmade Structure
UTL:	Utility
SNG:	Snag or dead tree
UNK:	Unknown

EXPOSURE OF NEST*

N:	North
S:	South
W:	West
E:	East
NW:	Northwest
NE:	Northeast
SW:	Southwest
SE:	Southeast

APPENDIX B
SPECIES SPECIFIC PROTOCOLS

Appendix B

BALD EAGLE WINTER ROOST SITES (BLM 2009)

Recommended protocol

1. Survey suitable roosting stands of coniferous and cottonwood trees during the period of Dec.1 to March 1 from 1 hour before sunrise or sunset to 1 hour after sunrise or sunset. Surveys after this period are not reliable. Evening surveys may be preferable as eagles often leave roost sites at or before dawn and may return to roost throughout the afternoon.

2. Helicopters or fixed-wing airplanes can be used for surveys. If not following a drainage, suspected roost habitat should be flown on north - south transects with lines about one km (.6 mi) apart. Under conditions of marginal light, transect width should be narrowed. Transects should be flown at about 100-150 meters (300-450 ft) above ground level. Whenever possible, two observers should be used in addition to the pilot so that one observer is always looking away from the sun regardless of the direction the aircraft is flying. Surveys should begin at the east edge of the survey area and work west to minimize the possibility of the plane flying over roost sites prior to them being observed.

3. Document all bald eagle observations using GPS equipment (UTMs - NAD83). Record: date, location, number seen, age class (adult, juvenile, unknown eagle) and habitat

4. Ground surveys will consist of at least three visits, with at least 1 week between visits. Visits should extend throughout the winter roosting season (recommended minimum of 1 visit per month), as eagle use is largely dependent on regional weather patterns, and eagle use often increases as the roosting season progresses.

MEXICAN SPOTTED OWL PROTOCOL

U.S. Fish and Wildlife Service. (2003). Mexican Spotted Owl Survey Protocol. http://www.fws.gov/mountain-prairie/endspp/protocols/MSOSurveyProtocol.pdf

BURROWING OWL PROTOCOL

Colorado Division of Wildlife. (2007). Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls When Conducting Prairie Dog Control. http://wildlife.state.co.us/NR/rdonlyres/C5D61571-F1DC-4679-ADD7-F3ABB339FB1C/0/BUOWSurveyProtocol2007.pdf

NORTHERN GOSHAWK PROTOCOL

Woodbridge, B.; Hargis, C.D. (2006). Northern Goshawk Inventory and Monitoring Technical Guide. Gen. Tech. Report WO-71. Washington, DC: U.S. Department of

Agriculture, Forest Service. 80p.
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APPENDIX C

RECOMMENDED SURVEY METHODOLOGIES,
TYPICAL NESTING SUBSTRATES AND BUFFER DISTANCES
FOR SPECIFIC RAPTOR SPECIES

From Romin and Muck (2002)

Recommended Survey Methodologies for Specific Raptor Species

	Ground searches				Aerial Searches		
Species	Sign/nest searches	Begging young	Snag tapping	Call playback	Helicopter	Fixed-wing	Comments
Bald Eagle	X					X	Large, conspicuous nest
Golden Eagle	X				X		
N. Harrier	X						
Osprey	X				X	X	Large, conspicuopus nest
N. Goshawk	X	X		X	X		Helicopter only in aspen, difficult
Cooper's hawk	X	X		X			butcher blocks, squirts
Sharp-shinned hawk	X	X					butcher blocks, squirts
Peregrine falcon	X	X			X		Helicopter can miss
Prairie falcon	X	X			X		Helicopter can miss
American kestrel	X						
Merlin	X						Nesting very uncommon Utah
Ferruginous hawk	X				X		Pinyon nests in tops, easy to see
Red-tailed hawk	X				X		
Swainson's hawk	X				X		
Boreal owl	X			X			Difficult, can use radio telemetry
Burrowing owl	X			X			
Flammulated owl			X	X			
Great-horned owl	X	X					
Long-eared owl	X			X			roosts - pellets, whitewash near nests
Northern saw-whet owl			X	X			
Short-eared owl	X						
N. pygmy owl	X			X			Very difficult, will not look out
W. screech owl	X		X	X			
Common barn owl	X	X					
Mexican spotted owl	X	X		X			
Turkey vulture	X						

Typical Nesting Substrate

Species	Coniferous	Broadleaf	Pinyon/ Juniper	Cavity	Cliff	Utility	Cave	Building	Ground	Comments
Bald Eagle	X	X								Super-dominant trees
Golden Eagle		X			X					Cliffs, large agricultural area trees
N. Harrier									X	Grassy fields
Osprey	X	X				X				Artificial platforms too
N. Goshawk	X	X								Often aspen
Cooper's hawk	X	X	X							Both riparian and forest trees
Sharp-shinned hawk	X		X							Dense conifers
Peregrine falcon					X			X		Scrapes on ledges
Prairie falcon					X					Scrapes on ledges
American kestrel				X						Both tree and cliff cavities
Merlin	X									Nesting very uncommon in Utah
Ferruginous hawk			X		X					Isolated or edge trees, bluffs and pinacles
Red-tailed hawk	X	X	X		X					Often cliffs, large pinyons
Swainson's Hhawk		X	X			X				Hedgerows, powerlines, isolated trees
Boreal owl				X						Boreal climate zone
Burrowing owl				X						In ground or gully wall
Flammulated owl				X						Flicker holes
Great-horned owl	X	X			X		X			Low on cliffs, old raptor nests, broken snags
Long-eared owl	X	X	X		X		X			Dense cover
Northern saw-whet owl				X						tree cavities, often snags
Short-eared owl										Grassy fields, wetlands
N. pygmy owl										tree cavities, often in snags
W. screech owl										tree cavities
Common barn owl				X			X	X		Behind ivy, holes in gully walls, farm buildings
Mexican spotted owl					X		X			Small caves on cliff walls
Turkey vulture					X					Also talus, brush piles

Table 2. Nesting periods and recommended buffers for raptors in Utah

Species	Spatial Buffer (miles)	Seasonal Buffer	Incubation, # Days	Brooding, # Days Post-Hatch	Fledging, # Days Post-Hatch	Post-fledge Dependency to Nest, # Days[1]
Bald eagle	1.0	1/1-8/31	34-36	21-28	70-80	14-20
Golden eagle	0.5	1/1-8/31	43-45	30-40	66-75	14-20
N. Goshawk	0.5	3/1-8/15	36-38	20-22	34-41	20-22
N. Harrier	0.5	4/1-8/15	32-38	21-28	42	7
Cooper's hawk	0.5	3/15-8/31	32-36	14	27-34	10
Ferruginous hawk	0.5	3/1-8/1	32-33	21	38-48	7-10
Red-tailed hawk	0.5	3/15-8/15	30-35	35	45-46	14-18
Sharp-shinned hawk	0.5	3/15-8/31	32-35	15	24-27	12-16
Swainson's hawk	0.5	3/1-8/31	33-36	20	36-40	14
Turkey vulture	0.5	5/1-8/15	38-41	14	63-88	10-12
California condor	1.0	NN yet	56-58	5-8 weeks	5-6 months	2 months
Peregrine falcon	1.0	2/1-8/31	33-35	14-21	35-49	21
Prairie falcon	0.25	4/1-8/31	29-33	28	35-42	7-14
Merlin	0.5	4/1-8/31	28-32	7	30-35	7-19
American kestrel	NN[2]	4/1-8/15	26-32	8-10	27-30	12
Osprey	0.5	4/1-8/31	37-38	30-35	48-59	45-50
Boreal owl	0.25	2/1-7/31	25-32	20-24	28-36	12-14
Burrowing owl	0.25	3/1-8/31	27-30	20-22	40-45	21-28
Flammulated owl	0.25	4/1-9/30	21-22	12	22-25	7-14
Great horned owl	0.25	12/1-9/31	30-35	21-28	40-50	7-14
Long-eared owl	0.25	2/1-8/15	26-28	20-26	30-40	7-14
N. saw-whet owl	0.25	3/1-8/31	26-28	20-22	27-34	7-14
Short-eared owl	0.25	3/1-8/1	24-29	12-18	24-27	7-14
Mex. Spotted owl	0.5	3/1-8/31	28-32	14-21	34-36	10-12
N. Pygmy owl	0.25	4/1-8/1	27-31	10-14	28-30	7-14
W. Screech owl	0.25	3/1-8/15	21-30	10-14	30-32	7-14
Common Barn-owl	NN[2]	2/1-9/15	30-34	20-22	56-62	7-14

[1] Length of post-fledge dependency period to parents is longer than reported in this table. Reported dependency periods reflect the amount of time the young are still dependent on the nest site; i.e. they return to the nest for feeding.

[2] Due to apparent high population densities and ability to adapt to human activity, a spatial buffer is not currently considered necessary for maintenance of American kestrel or Common barn-owl populations. Actions resulting in direct mortality of individual birds or take of known nest sites is unlawful.

State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining

Coal Regulatory Program Directive

Directive Number: Tech - 009

Effective Date:

Supersedes: None

Subject: **Protection and Enhancement Measures for Fish and Wildlife**

DRAFT

Approved: _____ John R. Baza, Director, Division of Oil, Gas, and Mining

DISCLAIMER

AThis non-binding directive is intended for internal direction for the Utah Coal Regulatory Program to clarify the implementation of the Utah Coal Rules. It neither confers rights nor imposes obligations on the Division or any other party. In the case where a conflict is perceived to exist between this directive and the Utah Coal Rules, the rules prevail.@

ABSTRACT

Protection and Enhancement measures for fish and wildlife are included as an integral part of each mining company's Mining and Reclamation Plan, (MRP). These measures are developed from resource information that is required through consultation with state and federal agencies with responsibilities for fish and wildlife and will be sufficient to design the protection and enhancement plan required under R645-301-333. The Division in consultation with these entities determines the scope and level of detail for such information. These measures may include but are not limited to developing site specific wildlife habitat, establishing conservation easements, constructing habitat enhancement structures, protecting and developing migration corridors, reestablishing transportation corridors that have been fragmented by access and haul roads where transplanting or relocation measures taken to avoid impacts to Fish and Wildlife. For the most part, the implementation of these measures is fairly straightforward. However, the implementation of some of these measures is subjective and some are misinterpreted. Wildlife Exclusionary periods are established time frames that are critical to the life cycle, continued survival and propagation of certain wildlife species. They are determined by the Division of Wildlife Resources, (DWR), the Fish and Wildlife Service, (FWS), the Forest Service, (FS), Bureau of Land Management, (BLM), School and Institutional Trust Lands, (SITLA) and the Division of Oil, Gas and Mining, (The Division). The dynamics of mining activities can impact certain wildlife species during these critical periods. In an effort to minimize adverse impacts to Wildlife species during these critical periods, mining companies are required to protect species during these exclusionary periods. They are typically incorporated as commitments or conditions in the permittee's Mining and Reclamation Plan, (MRP) or as a lease stipulation where federal coal or federal surface is

included in the leasing process. There are circumstances or situations based on the type of mining activity and behavior of a particular species that may be compatible with that particular species during these exclusionary periods. The Division has developed this technical directive in consultation with DWR, FWS, FS, BLM and SITLA to provide the mining industry and associated government and private entities guidance in conducting mining activities in a manner that avoids impacts to, and protects wildlife species during mining activities.

Table of Contents

1. REGULATORY BASIS

R645-300-113 requires the division to provide for the coordination of review and issuance of permits for coal mining and reclamation operations with applicable requirements of the Endangered Species Act, the Fish and Wildlife Coordination Act, The Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

R645-300-133.500 written findings require that the Division find in writing that the operation would not affect the continued existence of endangered or threatened species or result in the destruction or adverse modification of their critical habitats as determined under the Endangered Species Act of 1973.

R645-300-133.500 Written Findings for permit Application Approval. No permit application

or application for a permit change will be approved unless the application affirmatively demonstrates and the Division finds, in writing, on the basis of information set forth in the application or from information otherwise available that is documented in the approval of the following: The operation would not affect the continued existence of endangered or threatened species or result in destruction or adverse modification of their critical habitats as determined under the Endangered Species Act of 1973 (16 U. S. C. 1531 et seq,)

R645-301.310. Introduction. Each permit application will include descriptions of the;
311. Vegetative, fish, and wildlife resources of the permit area and adjacent areas as described under R645-301-320;

312. Potential impacts to vegetative, fish, and wildlife resources and methods proposed to minimize these impacts during coal mining and reclamation operations as described under R645-301.330 and R645-301.340; and
313. Proposed reclamation designed to restore or enhance vegetative, fish and wildlife resources to a condition suitable for the designed post mining land use as described under R645-301-340.

R645-301-322. Fish and Wildlife Information. Each application will include fish and wildlife resource information for the permit and adjacent area.

R645-301-322.100 The scope and level of detail for such information will be determined by the Division in consultation with state and federal agencies with responsibilities for fish and wildlife and will be sufficient to design the protection and enhancement plan required under R645-301-333.

R645-301-322.200 Site-specific resource information necessary to address the respective species or habitats will be required when the permit area or adjacent area is likely to include:

322.210. Listed or proposed endangered or threatened species of plants or animals or their critical habitats listed by the Secretary under the Endangered Species Act of 1973, as amended (16 U. S. C. 1531 et seq.) or those species or habitats protected by similar state statutes;

322.220. Habitats of unusually high value for fish and wildlife such as important streams, wetlands, riparian areas, cliffs supporting raptors, areas offering special shelter or protection, migration routes, or reproduction or wintering areas; or

322.230. Other species or habitats identified through agency consultation as requiring special protection under state or federal law

R645-301-322.230
R645-301-356.231
R645-301-358.200
30 CFR Ch. VII (7-1-02 Edition) 944.30, 5. The Division will make a decision on approval or disapproval of the permit on Federal lands. (a) Any permit issued by The Division will incorporate any terms or conditions imposed by the federal land management agency, including conditions relating to post-mining land use and will be conditioned upon compliance with the requirements of the federal land management agency. (b) The permit will include terms and conditions required by other applicable federal laws and regulations.

2. PURPOSE

The purpose of this directive is to provide a template for implementing the R645 rules that include consultation and the protection and enhancement of wildlife species.

The directive is intended to provide guidance to the Division when reviewing applications for mining activities that could impact wildlife or wildlife habitat, and approving such activities in a manner that avoids impacts to wildlife species during exclusionary periods.

The directive outlines the procedures that the Division will use in determining what mining and or mining related activities may or may not be conducted during exclusionary periods for wildlife species. The phases of mining activities include exploration, construction, operation and reclamation.

2. DEFINITIONS

"Construction" means those actions taken to construct a mine site including topsoil removal, excavation, road development, structure assembly, mine portal blasting or other high level noise activity or disturbance.

The construction period would be complete once all equipment used solely for construction is no longer in use and all high intensity noise and activities have ceased. Particularly regarding blasting during construction, a blast is considered a construction activity if it is less than 25 feet underground from the mine portal entrance.

"Exploration" means those activities associated with minor or major coal exploration as regulated by the R645 Rules. These activities include all construction, exploration and reclamation actions related to the exploration project.

"**Habitats of Unusually High Value for Fish and Wildlife**" means an area defined by the state as crucial-critical use areas for wildlife and includes important streams, wetlands, riparian areas, cliffs supporting raptors, areas offering special shelter or protection, migration routes, or reproduction and wintering areas.

"Operations" means those activities that occur during actual mining of coal. This includes any activity, related to the extraction and transport of coal, which remains at a constant level of noise and visual disturbance on a day-to-day basis. Blasting activities are considered an operation activity if the blast is concentrated to 25 feet deep or more from the surface.

"Mitigation" refers to projects intended to offset impacts caused by a disturbance. All disturbances during exclusionary periods must receive approval prior to initiation. All mitigation projects shall be approved by

DOGM, FWS and DWR prior to the disturbance.

"Reclamation" means those actions taken to restore mined land as required by the R645 Rules to a postmining land use approved by the Division.

Reclamation activities include demolition, backfilling and regrading, recontouring, seedbed preparation, revegetation, mulching or fertilizing, sediment control structural removal, or any other activity associated with reclamation that would not normally occur during operations.

The reclamation phase would be complete once the Division has approved phase III bond release.

3. POLICY

Wildlife tolerance to disturbance is generally species-specific so protection and enhancement measures must be developed on a case-by-case basis depending on the species and habitat present and the disturbance activity involved. The following sections explain the process to develop an appropriate protection and enhancement plan.

Information Required in the Mining and Reclamation Plan.

A description of how, to the extent possible, using the best technology currently available, the operator will minimize disturbances and adverse impacts to fish and wildlife and related environmental values during coal mining and reclamation operations, including compliance with the Endangered Species Act of 1973. The plan must also include protective measures that will be used during the active mining phase of operation including the establishment of buffer zones, the selective location and special design of haul roads and powerlines, and the monitoring of surface water quality and quantity. A description of how the operator conducting coal mining and reclamation operations will avoid disturbances to, enhance where practicable, restore, or replace, wetlands and riparian vegetation along rivers and streams and bordering ponds and lakes. And enhance where practicable, or restore, habitats of unusually high valued for fish and wildlife. R645-301-330 et sec.

Protection and Enhancement Plan

Resource Identification

The first step when determining the extent of disturbance on fish and wildlife or high value habitats is to identify the resources that will be affected.

Existing data on wildlife habitat locations are available by contacting the Utah Division of Wildlife Resources (DWR). The Division, in consultation with the DWR and USFWS determines the scope and level of detail for fish and wildlife information in the proposed permit and adjacent area. The agencies consider the topography, vegetation communities, elevation, connectivity and other factors when determining

potential fish and wildlife present in a proposed area.

Once the agencies determine the habitats and associated species that could be present in the proposed permit and adjacent area, the permittee is then required to conduct *surveys* for these potential fish and wildlife species to determine presence. Surveys are species specific, so the amount, type, and timing of the surveys will differ.

Protection Plan

Spatial Buffers. The most effective protection for any species is obviously avoidance. The first plan that should be considered is to avoid areas that contain sensitive fish and wildlife species or their habitats. DWR and the USFWS have set specific spatial buffer distances for most wildlife species so that disturbance can be minimized.

Seasonal Buffers. If the spatial buffer areas cannot be avoided, the next plan that should be considered is to avoid these sensitive areas during crucial life periods for wildlife such as important breeding and nesting times. Such time periods can be obtained from the DWR or USFWS.

Mitigation. Lastly, if the activity cannot be conducted outside both the spatial and seasonal buffers, then permittee must develop an alternate protection plan in consultation with the Division and wildlife management agencies.

Sensitive species, threatened, endangered or candidate species or species with conservation agreements have additional protection laws such as the Migratory Bird Treaty Act and the Endangered Species Act and therefore may require additional protection.

Enhancement Plan

The operator is required to provide a description of how they will avoid disturbance to and enhance wetlands and riparian vegetation and habitats of unusually high value to fish and wildlife. If these areas could not be avoided during mining operations, the operator must restore or replace the areas. The enhancement plan must be developed in consultation with the Division and wildlife agencies to ensure compliance with associated state and federal wildlife protection laws. For instance, if the areas contain nesting or breeding sites for federally protected species, then the USFWS must be notified and consulted when developing the protection and enhancement plan. The USFWS will determine whether the protection and enhancement plan is adequate to minimize adverse effects to the identified species, or may issue a take permit if the disturbance cannot be avoided or mitigated.

The sections listed below are organized by type of disturbance activity and outline a generalized process for regulators to follow when developing a protection and enhancement plan.

Specific Mining Activities

Exploration

Exploration is typically a short-duration event that disturbs a relatively small surface area. The Division only regulates exploration activities if located within the permit area, or on State Institutional Trust Lands (STILA); otherwise, the surface owner regulates the activity. Therefore, ***exploration*** activities, occurring within the permit area, must be accompanied with a protection and enhancement plan for wildlife and habitats of unusually high value for fish and wildlife. If exploration activities during exclusionary periods cannot be avoided, the Division will grant approval only if prior to any activity, representatives from DOGM, Wildlife agencies, and land management agencies clearly agree that the continued existence and propagation of the species in question would not be impacted by the proposed activity. The permittee shall contact the DOGM, wildlife agencies, and appropriate land management agencies prior to exploration activities. If the agencies determine that mitigation plans are required, the mitigation plans shall be complete and adequate, prepared in a format approved by the Division, and approved and incorporated in the MRP prior to the initiation of any activity. Recommendations of the surface owner of the proposed exploration area will be included in the permitting process. As stated previously, if the activity is within the existing permit area or on SITLA land, or the Division determines the area must be permitted, then the activity will be regulated by the Division in consultation with land management and state and Federal Wildlife agencies. If the land is owned by the BLM or the USFS, and will not be included in the permit area according to the Division, then the activity will be regulated by the BLM or USFS respectively.

Construction

Construction typically involves high-level noise and high intensity activities. Therefore, prior to commencement of construction, a protection and enhancement plan must be developed in consultation with the Division and State and Federal Wildlife agencies. Exclusionary periods are to be adhered to for the ***construction*** phase of mining activities for any new or additional surface disturbances.

If construction during an exclusionary period cannot be avoided, the Division will grant approval only if, prior to any activity, representatives from DOGM, wildlife agencies, and appropriate land management agencies clearly agree that the continued existence and propagation of the species in question would not be impacted by the proposed activity.

The permittee shall contact the DOGM, wildlife agencies, and appropriate land management agencies prior to construction activities. If the agencies determine that mitigation plans are required, the mitigation plans shall be complete and adequate, prepared in a format approved by the Division, and approved and incorporated in the MRP prior to the initiation of any activity. The Division will be responsible for

overseeing the protection and enhancement plan development and implementation. The land management agency and wildlife agencies will be consulted prior to approval or implementation.

Operations

Operation activities typically involve a constant level of noise and commotion that enables wildlife to acclimate more readily than activities associated with construction and reclamation. Therefore, for the ***operational*** phase of mining activities exclusionary periods would not apply as long as the coal mining operations remain at a constant level. The permittee shall contact the Division, wildlife agencies, and appropriate land management agencies prior to any sudden major change in noise level or activity, or for a new construction or reclamation activity occurring contemporaneously with operation activities.

Reclamation

For the ***reclamation*** phase of mining activities for new or additional surface disturbances:

Exclusionary periods are to be adhered to unless a pre-reclamation site visit by the permittee, representatives from DOGM, wildlife agencies, and land management agencies clearly indicates and all parties agree that the continued existence and propagation of the species in question would not be impacted by the proposed activity.

The permittee shall contact the DOGM, the DWR, the FWS and the appropriate land management agencies and arrange a site visit prior to reclamation activities. If the agencies determine that mitigation plans are required, they shall be complete and adequate, prepared in a format approved by the Division, approved and incorporated in the MRP prior to the initiation of any activity.

The Division will be responsible for overseeing the protection and enhancement plan development and implementation. The land management agency and wildlife agencies will be consulted prior to approval or implementation.

4. ASSUMPTIONS

The following assumptions are made:

A. The exclusionary periods and buffer distances will be determined by the Division of Wildlife Resources, (DWR), the Fish and Wildlife Service, (FWS) the Forest Service, (FS), Bureau of Land Management, (BLM), School and Institutional Trust Lands, (SITLA) and the Division of Oil, Gas and Mining, (The Division). The permittee is responsible for meeting the exclusionary period requirements set forth by each agency.

B. The greatest level of impact or displacement to wildlife may occur during the exploration, construction

or reclamation phases of mining activities. These activities need to be conducted prior to or after established exclusionary periods. The optimal time to implement the construction phase is between exclusionary periods allowing ample time for habituation. The probability of habituation is much greater during the operational phase of mining.

C. Exclusionary periods are not intended to invoke as much surface related activity as possible prior to a closure period so as to disturb, displace, and interfere with or otherwise impact wildlife species during a closure period. Conducting exploration, construction or reclamation activities prior to and continuing through an established exclusionary period augments the disruption of wildlife species during the critical part of their life cycle and is not consistent with the regulatory requirements at R645-301-330, 333 that require the permittee to minimize disturbances and adverse impacts to fish and wildlife species or other species protected by state and federal law. If the Division determines, in consultation with DWR, FWS, and the appropriate land management agency that an activity may occur during an exclusionary period, a plan to minimize the disturbance and to mitigate the disturbance must be submitted to and approved by the respective agencies prior to the disturbance.

D. The Mining and Reclamation plan, (MRP), and any special permit conditions imposed by the Division and or land management agencies will serve as the basis for determining the level of mining activities during exclusionary periods. The Division will determine the level of activity based on, but not limited to, the information provided by the permittee, and wildlife agencies. The Division will be responsible for overseeing the protection and enhancement plan development and implementation. The land management agency and wildlife agencies will be consulted prior to approval or implementation.

E. The permittee will be in compliance with the approved reclamation and operational plans, permit conditions and performance standards at all times.

5. REFERENCES

The major sources of information that the Division uses to determining the level of mining activities during exclusionary periods are as follows:

A. Romin, L.A. and J.A. Muck. 2002. Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances. U.S. Fish and Wildlife Service Unpublished Report.

B. Reynolds, R.T., Graham, R.T., Reiser M., Hildegard et. Al. 1992. Management recommendations for the northern goshawk in the southwestern United States. Gen. Tech. Rep. RM-217, Ft. Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 90 p.

7. EFFECT ON OTHER DOCUMENTS

None

8. DIVISION CONTACT/WORK GROUP

Daron Haddock, Jim Smith, Ingrid Wieser, Joe Helfrich and successors DWR, FWS, BLM, SITLA, FS.

9. KEY WORDS

Construction, consultation, exclusionary periods, mining activities, mitigation, operations, reclamation

10. APPENDICIES

APPENDIX A: Records Availability

APPENDIX B:

Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances

Golden Eagle Nesting Chronology by Jim Parish

APPENDIX A

Records Availability

The MRP

Information used by the Division that is not part of the mining and reclamation plan will be kept in the Division public information room. Some information related to this document may be classified as confidential. Unless otherwise noted the public information is available for review during normal working hours at the Division of Oil, Gas, & Mining Salt Lake Office public records room.

In addition the Division will also keep an electronic copy of the MRP.

APPENDIX B

\\NRSLNWOGM\OGM\GROUPS\COAL\WP\DIRECTIVES\TECHDIRECTIVES\DRAFT\REVISEDTECH-009WILDLIFE EXCLUSIONARY PERIODS.DOC

0005

General Correspondence Incoming
cc: Dana
Joe
Ingrid K

United States Department of the Interior
FISH AND WILDLIFE SERVICE

UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

In Reply Refer To
FWS/R6
ES/UT
10-TA-0005

January 22, 2010

Daron Haddock
Permit Supervisor; Coal Program
Utah Department of Natural Resources
Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801

RE: Satisfying the 1996 Biological Opinion on Surface Coal Mining and Reclamation Operations for Impacts to Federally Listed Colorado River Fish Species in the Green and Colorado River Basins, Utah

Dear Mr. Haddock:

The purpose of this letter is to establish species-specific standards and procedures to protect federally listed Colorado River fish species from impacts related to coal mining operations in the upper Colorado River basin of Utah. The species-specific standards and procedures described in this letter are designed to fulfill the requirements under the 1996 Biological Opinion on Surface Coal Mining and Reclamation Operations (1996 BO), satisfying the responsibilities of the Utah Division of Oil, Gas, and Mining (UDOGM) and the US Fish and Wildlife Service (Service). The standards and procedures will provide minimum permitting and performance standards for protection and enhancement of the federally endangered Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), bonytail (*Gila elegans*), and razorback sucker (*Xyrauchen texanus*) and their designated critical habitat (Colorado River fish species) when coal operations occur in the Green and Colorado River basins and are greater than 10 miles from designated critical habitat. This letter does not discuss standards and procedures for any other species, nor does it discuss standards and procedures for coal operations less than 10 miles from designated critical habitat. Projects that are within 10 miles of critical habitat may have additional impacts that would not be covered under the 1996 BO.

The 1996 Biological Opinion

On March 21, 1995, the Office of Surface Mining (OSM) requested formal consultation regarding the continuation and approval of surface coal mining and reclamation operations under State and Federal regulatory programs. A Biological Opinion and Conference Report were completed by the Service on September 24, 1996. The 1996 BO established guidance for complying with both the Surface Mining Control and Reclamation Act of 1977 (SMCRA) and the Endangered Species Act of 1973 (ESA). The Service concluded that the implementation of surface mining activities consistent with regulations (30 CFR Part 700 to end) is not likely to jeopardize the continued existence of any threatened, endangered, or proposed species or result in adverse modification of designated or proposed critical habitats. This conclusion was predicated on implementation of the requirements described in the document and the terms and conditions set forth in the incidental take statement. Fulfilling the responsibilities outlined in the 1996 BO achieves ESA compliance for all federally-related activities by the Regulatory Authority, be it the State or OSM.

The following is a summary of the requirements of the 1996 Biological Opinion on Surface Coal Mining and Reclamation Operations:

A. General Requirements

1. The review and issuance of permits must include the consideration of listed resources.

B. Pre-Application

1. The Service Field offices will distribute and update a list of species and critical habitat and specific protection measures needed for these species and critical habitat to OSM and the Regulatory Authority.
2. The Regulatory Authority will determine whether a listed species or critical habitat is present in a proposed permit area or adjacent area based on the list provided by the Service.
3. When listed species or critical habitat are present in the permit area or adjacent area, the Regulatory Authority will coordinate with the Service and State Wildlife Agency to determine the scope and level of detail of resource information contained in a permit application.
4. The Regulatory Authority will provide to the applicant an explanation of the scope and level of detail necessary to complete the resource information in the permit application.

C. Permit application package

1. The Applicant shall include the following resource information in permit applications for listed or proposed species or their critical habitat:
    a. Site-specific resource information.
    b. A protection and enhancement plan that describes how the operator will minimize disturbances and adverse impacts:
        i. Protective measures during the active mining phases of the operation.

ii. Enhancement measures during the reclamation and post-mining phase of the operation.

2. The Service will review the resource information in the permit application. The Service requests the information from the Regulatory Authority which is to be provided within 10 days of the request.
3. OSM, State Regulatory Authorities, and the Service must develop additional species-specific or site-specific standards and procedures to protect listed resources.
4. The Regulatory Authority will quantify take of listed species resulting from mining operations. Quantification of take occurs on a permit-by-permit basis.
5. The Service will develop, in close coordination with OSM and the State regulatory Authority, any necessary site-specific measures to minimize potential take. The measures must be enforceable under the mining permit.
6. The Regulatory Authority will provide to the Service a written explanation whenever the authority decides not to implement species-specific measures recommended by the Service. The Service provides a concurrence letter to the Regulatory Authority if the Service concurs with the Regulatory Authority's action. If the Service does not concur with the Regulatory Agency's action an, elevation process will be used to reach agreement on the implementation of the species-specific measures.

D. Notification of Receipt of Complete Permit Application and Subsequent Permitting Actions

1. The Regulatory Authority will notify the Service of completed application, a significant revision to a permit, or a renewal of a permit.

E. Written Findings

1. As a precondition for approval of a permit application, the Regulatory authority will find, in writing, that the mining operation will not jeopardize listed species or result in adverse modification of critical habitat, based on the information in the mining application.
2. The Regulatory Authority will make a written finding that the exploration and reclamation activities will not jeopardize the continued existence of an endangered species or threatened species or result in destruction or adverse modification of critical habitat of those species.

F. Notification of Decision

1. The Regulatory Authority will notify the Service, in writing, concerning decision made on permit issued that the Service has offered comments.

G. Performance Standards

1. The Operator determines whether a listed species is present in the permit area or adjacent area during the pre-application phase of the operation or, if new information is presented at any time during the mining operation.
2. The Regulatory Authority consults with the State and the Service when the Operator determines that a listed species occurs in the permit area. The Regulatory Authority, in consultation with the Service, must identify whether, and under what conditions, the operator may proceed with the operation if listed species occur in the permit area.

3. The Operator shall use the best available technology to minimize disturbance of and adverse impacts to fish, wildlife, and related environmental values and shall achieve enhancement of these same resources where practicable.
4. The Operator will not jeopardize listed species or adversely modify critical habitat during mining operations.
5. The Regulatory Authority must notify the Service within one working day if a dead or impaired individual of a listed species is found in the permit area or in adjacent areas.
6. OSM and the Regulatory Authority must regulate the mining activity covered by the incidental take statement in the 1996 BO and in site-specific incidental take statements. The protective coverage for the operator against the unlawful take of listed species may lapse if the regulatory authority fails to require permittees to adhere to, or if OSM fails to monitor compliance with, the terms and conditions of the incidental take statement.
7. The Regulatory Authority must implement any species-specific protective measures to minimize anticipated incidental take. The Regulatory Authority must also require compliance by the operator with the species-specific protective measures.

H. Coal Exploration

1. The Applicant will include a description of any listed species within proposed exploration areas in exploration permits.
2. The Regulatory Authority shall only approve coal exploration permits if the Applicant has demonstrated that the action will not jeopardize listed species or adversely modify critical habitat.
3. The Operator will not disturb critical habitat during coal exploration as part of the performance standards.

I. Midterm Permit Review and Permit Renewal

1. The Regulatory Authority must require a reasonable revision of a permit at any time if the operation is not in compliance with the species protection provisions of the approved regulatory program.

J. Conservation Recommendations

1. The Service will recommend discretionary conservation recommendations to OSM in order to minimize or avoid adverse effects of the mining operation to listed species.

K. Reinitiation of Consultation

1. Reinitiation of consultation may be requested by OSM or the Service if
   a. new information indicates that the approval or conducting of mining operation and reclamation is affecting listed species or modifying critical habitat in a manner or extent not considered in the 1996 BO or
   b. the approval or conducting of mining operation and reclamation is modified in a manner not considered in the 1996 BO that causes an adverse effect to listed species or critical habitat.

L. Cumulative Effects

1. The Applicant, in cooperation with the regulatory authority, must analyze cumulative impacts of mining operations at the site-specific level if listed resources are present in the action area.

In fulfillment of A.1, this letters communicates the processes that must occur to meet the above requirements for federally listed Colorado River fish species in Utah.

Endangered Colorado River Fishes

The Colorado pikeminnow, razorback sucker, humpback chub and bonytail are endangered fish species that once thrived in the Colorado River system. These fish species are now endangered in part because of human impacts on their habitat over the past 100 years. The two types of habitat alterations that appear to have had the greatest impact on the endangered fish species have been water development and introduction of non-native fishes. Specifically, hundreds of dams, diversions and other barriers have been constructed, river flows have been cut by a third, and more than 40 species of non-native fish have been introduced in the upper Colorado River basin.

Critical habitat for these species was established on March 21, 1994 (59 FR 13374). In Utah, designated critical habitat includes portions of the San Juan, Green, Colorado, White and Duchesne Rivers and their 100-year floodplains (Appendix A). All four of the listed Colorado River fish require the same Primary Constituent Elements (PCEs) of critical habitat essential for their survival: water, physical habitat, and the biological environment. This includes a quantity of water of sufficient quality that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage for each species. The physical habitat includes areas of the Colorado River system that are inhabited or potentially habitable for use in spawning and feeding, as a nursery, or serve as corridors between these areas. In addition, oxbows, backwaters, and other areas in the 100-year floodplain, when inundated, provide access to spawning, nursery, feeding, and rearing habitats. Food supply, predation, and competition are important elements of the biological environment.

Upper Colorado River Endangered Fish Recovery Program

Because water depletions from the upper Colorado River basin are a major factor in the decline of the endangered fishes, the Service initially determined that any depletion will jeopardize their continued existence and will likely contribute to the destruction or adverse modification of their critical habitat (US Fish and Wildlife Service, Region 6 Memorandum, dated July 8, 1997). To address depletion issues, the Department of the Interior, the states of Wyoming, Colorado and Utah, and the Western Area Power Administration established the Recovery Implementation Program for Endangered Fish Species in 1988.

Called the Upper Colorado River Endangered Fish Recovery Program (Recovery Program), this effort involves federal, state and private organizations and agencies in Colorado, Utah, and Wyoming. The program complies with all applicable laws, including the federal Endangered

Species Act, state water laws, river laws, and interstate water compacts. Recovery strategies include conducting research, improving river habitat, providing adequate stream flows, managing non-native fish, and raising endangered fish in hatcheries for stocking.

In order to further define and clarify the process in the Recovery Program, a section 7 agreement (Agreement) was implemented by the Recovery Program participants on October 15, 1993. The agreement stipulated that the Recovery Program acts as the reasonable and prudent alternative (RPA) for depletion impacts in the Upper Colorado River Basin, in order to avoid jeopardy to the endangered fishes. Incorporated into this agreement is a Recovery Implementation Program Recovery Action Plan which identifies actions required to recover the endangered fishes in the most expeditious manner.

After many years of successful implementation of the Recovery Program and Agreement, federal action agencies have come to anticipate Recovery Program activities and a requirement of a financial contribution (also known as a depletion fee) toward these activities serving as the RPA that must be included in their project planning to avoid jeopardy to listed species. Thus, the RPA has essentially become part of the proposed action. Consequently, the Recovery Program activities now serve as conservation measures within the proposed action and minimize adverse effects to listed species or critical habitat. Because of this conservation measure, the Service can now make the determination that water depletions in the Colorado River basin may affect and are likely to adversely affect the Colorado River fish species, which is a non-jeopardy determination.

As mentioned above, included in the Recovery Program was the requirement that a one-time depletion fee would be paid to help support the Recovery Program. This figure was set at $10.00 per acre-foot (AF) based on the average annual depletion of the project and is adjusted annually for inflation (the FY2010 figure is $18.99 per AF). However, on July 8, 1997, the Service issued an intra-Service biological opinion determining that the depletion fee for average annual depletions of 100 AF or less are no longer required because the Recovery Program has made sufficient progress and now is the reasonable and prudent alternative to avoid the likelihood of jeopardy to the endangered fishes and to avoid destruction or adverse modification of their critical habitat. It is important to note that these provisions of the Recovery Program were based on appropriate legal protection of the instream flow needs of the endangered Colorado River fishes.

Satisfying the 1996 BO for Federally Listed Colorado River Fishes in Utah

Using the requirements summary above, the following standards and procedures will satisfy the 1996 BO for federally listed Colorado River fishes in Utah.

A. General Requirements

The Service and UDOGM have cooperatively discussed instituting a clear, standardized system for considering impacts to the federally listed Colorado River fish species from coal-mining operations, satisfying requirement A.1. This letter describes the outcomes of these discussions and the specific steps each agency must take to meet the above requirements.

B. Pre-Application

Satisfying requirement B.1, the Service maintains a list of endangered, threatened, proposed, and candidate species that occur in each Utah county. This list can be accessed on the internet at http://www.fws.gov/mountain-prairie/endspp/countylists/utah.pdf. For Colorado River fish species, UDOGM must determine in what river basin coal-mining operations occur. If operations occur in any part of the Green or upper Colorado River basins (Appendix A), UDOGM shall then determine that operations could have impacts to Colorado River fish species (B.2). UDOGM shall then follow the guidance in this letter to determine the scope and level of resource information contained in a permit application (B.3) and will provide an explanation of this to the applicant (B.4).

C. Permit Application Package

The Service and UDOGM have agreed on site-specific standards and procedures to protect the Colorado River fish species (C.3). The vast majority of coal mining occurs in headwater areas, far from designated critical habitat. Impacts to the fish species from these operations are limited to water depletions and possible water discharges. Standards and procedures that relate to water depletions are in accord with the Recovery Program and are consistent with Service consultation processes for other industries (agriculture, oil and gas developments, etc.). Standards and procedures that relate to possible water discharges are consistent with state water quality requirements. However, in the event that a coal mining operation occurs within 10 miles of designated critical habitat, which includes the 100-year floodplain, the simplified process described below does not apply and individual project consultation must occur.

For operations occurring within the Green or Colorado River basins, the Service requires that specific resource information be provided in the permit-application package. Site specific resource information (C.1.a) must include a complete description of:

- The project's water right, including source (if leased from another water right holder), duration of use, and amount (calculated for annual use in acre-feet);
- Any planned changes to the hydrologic condition of the site outside of the water right consumption, such as planned water discharges (amount and duration), known aquifer encounters, de-waterings of streams and changes in channel course; and
- The project location, which should include:
    - A site map with project boundaries and areas of disturbance clearly marked;
    - USGS 8-digit Hydrologic Unit Code (HUC) of all watersheds in which the project will occur[1]; and
    - Distance (in river-miles) from project location to nearest designated critical habitat reach.

[1] A description of the HUC system can be found at http://water.usgs.gov/GIS/huc.html and a list of HUCs for the state of Utah can be found at http://water.usgs.gov/GIS/huc_name.html

A protection and enhancement plan describing the minimization of disturbances and adverse impact must be filed with the permit application package (C.1.b). Information that must be included in the plan's description (C.1.b.i) includes:

- Protective measures describing the water quality of all water (planned or potential) that is released during the operation of the mine.
    - For example, a description of state water quality requirements for released water will allow the Service to determine if water quality is ecologically suitable for aquatic species;
- Enhancement measures describing the reclamation of mining sites and mine closure.
    - Disturbed areas (work site(s), stockpile site(s), pit) should be revegetated when appropriate after operations with native plants or certified weed-free native seed. The planting should be monitored for success. If the planting fails it should be reseeded/planted;
- Protective measures describing response to accidental pollution spills; and
- Enhancement measures describing how local water quality will be maintained after mine closure, including the prevention of mine drainage.

Conservation measures (C.3) implemented to offset water depletions in the upper Colorado River basin will follow the Upper Colorado Basin Endangered Fish Recovery Program, under the following procedure:

I. The Service and UDOGM will assume that the coal mining operations will fully use their allotted annual water right. They will calculate the project's annual depletion as that amount for Section 7 of the Endangered Species Act purposes and in order to calculate the depletion fee.
    a. Although a coal operation may use less water than this amount, it is very difficult to calculate a coal operation's annual water usage in advance because coal operations may change as conditions warrant. Because Section 7 consultation must occur before a project may begin and because a depletion increase of 10% will re-initiate consultation, it is likely that a project may require multiple consultations. Consulting on the maximum possible annual depletion allowed under the applicant's water right will serve to reduce the number of consultations, cover all projects activities, and simplify the process.

II. If the operations will occur in the Green or upper Colorado River Basins, the coal operator will submit the one-time depletion fee before operations may begin. The depletion fee only serves as a conservation measure for the project's depletion. Additional conservation measures (C.3) must be enacted if further project related impacts are present. Payment must be made to the National Fish and Wildlife Foundation and mailed to:

National Fish and Wildlife Foundation
1133 15th Street, NW
Suite 1100
Washington, DC 20005

a. Annual water depletions under 100 AF do not require a depletion payment, as described above.
b. Annual water depletions above 100 AF and less than 4500 AF will be charged the fiscal year rate (adjusted annually). For FY 2010 the rate is $18.99 per AF. UDOGM will check with the Service in August of each year for the new fiscal year rate.
c. Annual depletions above 4500 AF will require an individual project consultation, as the depletion fee does not serve as a conservation measure for such large depletions.

III. The Service will be notified of all depletions, whether they require a fee or not, in order to continue to track the total depletions occurring in Utah.

IV. The applicant may use discharged water to offset depletion amounts. In order for a discharge to have no effect on the Colorado River fish species, and therefore be allowed to offset any project depletions, the water must be of suitable quality for aquatic species. The applicant must document the following:

a. The volume of expected mine water discharge;
b. The stream course into which the water is released, ensuring that the water is discharged in a manner that contributes to upper Colorado River basin flows;
c. The discharged water conforms to all applicable water right law; and
d. The discharged water meets all state and federal water quality parameters, thus making the water suitable for aquatic species:
    i. Water Quality of the State (Utah Administrative Code: Rule R317-2[2]) for each individual surface water body based on Use Designations (R317-2-6) and corresponding Numeric Criteria (R317-2-14);
    ii. Utah Division of Water Quality Ground Water Quality Standards[3]; and
    iii. Utah Pollution Discharge Elimination System (UPDES) permits.

V. UDOGM has the discretion to determine whether a proposed coal mining activity constitutes a depletion. A guide for determining depletions is provided by UDOGM's "Water Depletion For Coal Mining Operations". When these determinations are made, UDOGM will provide the Service with a brief description of the reasons behind the determination.

UDOGM shall quantify take (C.4) as the level of water reduction from the upper Colorado River basin. Estimating the number of individuals of these species that would be taken as a result of the water depletions is difficult for a number of reasons, therefore it is standard Service practice to quantify take as a measure of the water depletion.

[2] Available at http://www.rules.utah.gov/publicat/code/r317/r317-002.htm#T16
[3] Available at http://www.waterquality.utah.gov/GroundWater/gwstandards.htm

D. Notifications and Subsequent Permitting Actions

UDOGM will notify the Service of a complete application, a significant revision to a permit, or a renewal of a permit.

E. *Written Findings*

For proposed permit applications, UDOGM will submit a written finding stating that the proposed mining operations, exploration and reclamation will not jeopardize the continued existence of listed species or adversely modify critical habitat.

F. *Notification of Decision*

UDOGM will notify the Service concerning any decisions made concerning permits on which the Service has commented. UDOGM will also notify the Service of any significant pollution spills that occur, so that the Service can assess the impacts of the spill. The Service will provide UDOGM a written letter either concurring with UDOGM's written findings or providing additional conservation methods within 30 days of receipt of UDOGM's letter.

G. Performance Standards.

For coal operations that occur greater than 10 miles from designated critical habitat for Colorado River Fish Species, following the depletion and discharge guidelines outlined in this document will satisfy the requirement of G.4, in which the operator must not jeopardize listed species or adversely affect critical habitat.

H. Coal Exploration

The Applicant will include a description of any listed species within proposed exploration areas in exploration permits. UDOGM shall only approve coal exploration permits if the Applicant has demonstrated that the action will not jeopardize listed species or adversely modify critical habitat. The Operator will not disturb critical habitat during coal exploration as part of the performance standards.

I. Midterm Permit Review and Permit Renewal

UDOGM must require a reasonable revision of a permit at any time if the operation is not in compliance with the species protection provisions of the approved regulatory program.

J. Conservation Recommendations

The Service has no specific discretionary conservation measures that apply to all projects that have not already been discussed in this document.

K. Reinitiation of Consultation

Consultation will be reinitiated under guidelines K.1.a & b (found above) and under 50 CFR 402.16, which states:

> "Reinitiation of formal consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and:
>
> a) If the amount or extent of taking specified in the incidental take statement is exceeded;
> b) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
> c) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or
> d) If a new species is listed or critical habitat designated that may be affected by the identified action."

Under reinitiation criteria b, if a permitted coal operation plans to increase the water depletion by more than 10% of that already approved in the Mining and Reclamation Plan, then reinitiation must occur unless a mine water discharge offset can be demonstrated. (C-IV, page 10)

Cumulative Effects

The Applicant, in cooperation with UDOGM, must analyze cumulative impacts of mining operations at the site-specific level if listed resources are present in the permit or adjacent area.

Other Requirements

Some projects may not be covered under this guidance document and will require separate consultation. This includes, but is not limited to coal operations that may jeopardize the species through impacts not covered in this document and that occur within 10 miles of designated habitat.

Conclusion

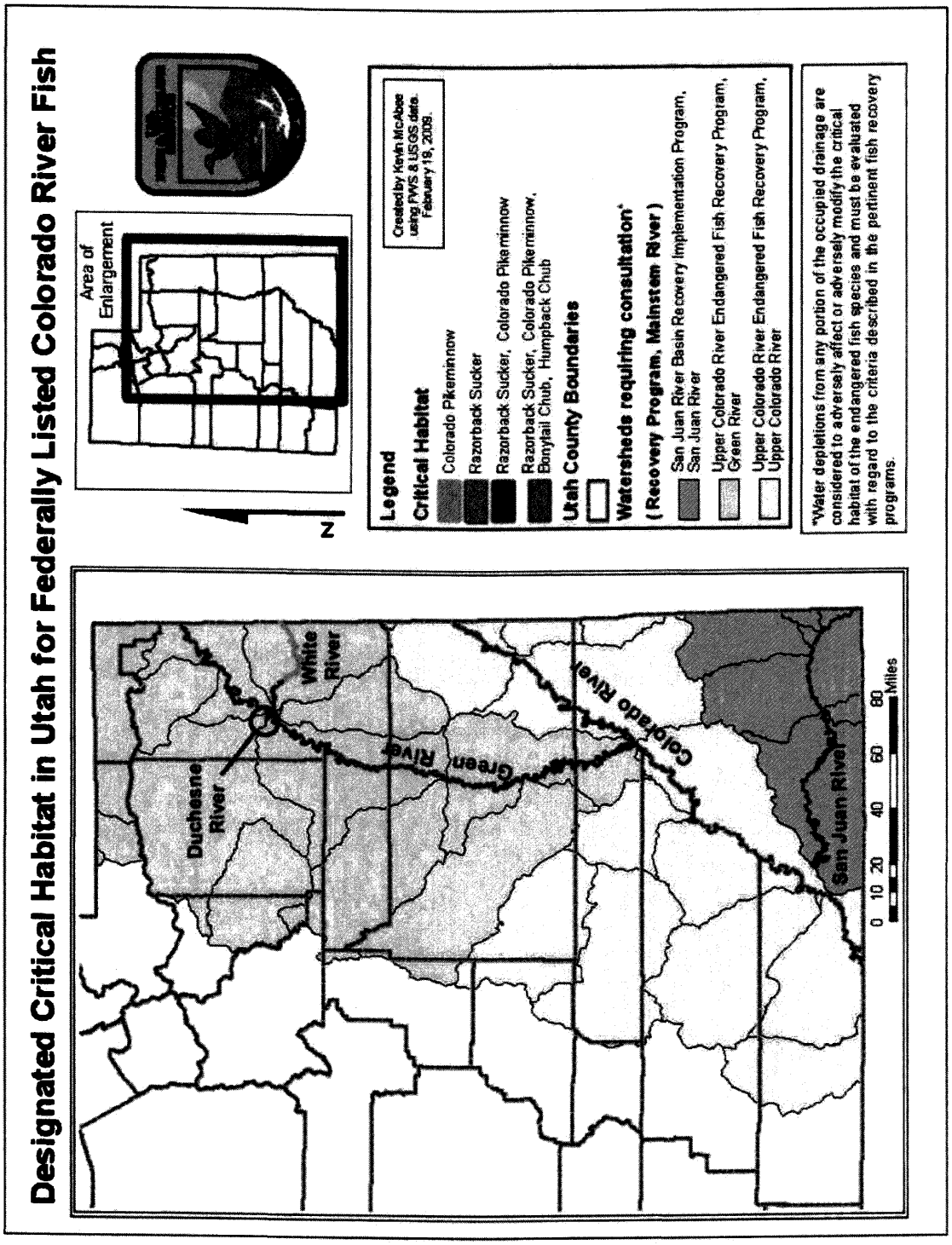
This completes the Service's communication of standards and procedures required to satisfy the 1996 BO for Colorado River Fishes. We appreciate UDOGM's commitment in the conservation

of endangered species. If you require further assistance or have any questions, please contact Kevin McAbee, at (801) 975-3330 extension 143.

Sincerely,

Larry Crist
Utah Field Supervisor

Appendix A


Designated Critical Habitat in Utah for Federally Listed Colorado River Fish
Area of Enlargement
N
Legend
Critical Habitat
Colorado Pikeminnow
Razorback Sucker
Razorback Sucker, Colorado Pikeminnow
Razorback Sucker, Colorado Pikeminnow, Bonytail Chub, Humpback Chub
Utah County Boundaries
Watersheds requiring consultation*
(Recovery Program, Mainstem River)
San Juan River Basin Recovery Implementation Program, San Juan River
Upper Colorado River Endangered Fish Recovery Program, Green River
Upper Colorado River Endangered Fish Recovery Program, Upper Colorado River
Created by Kevin McAbee using FWS & USGS data. February 19, 2009.
*Water depletions from any portion of the occupied drainage are considered to adversely affect or adversely modify the critical habitat of the endangered fish species and must be evaluated with regard to the criteria described in the pertinent fish recovery programs.
Duchesne River
White River
Green River
Colorado River
San Juan River
0 10 20 40 60 80
Miles

Water Depletion For Coal Mining Operations

Utah Division of Oil Gas and Mining

07/28/09

Introduction

The following set of instructions/calculations is designed to provide standard methods to calculate water consumption due to coal mining activities. These calculations may be used to determine if the consumption of water from coal mining is contributing or will contribute to water depletion that may affect endangered fish in the Upper Colorado River. **The Division, in consultation with the U. S. Fish and Wildlife Service (USFWS), recommends that water depletion be calculated based on water rights. Should a mine choose to use the following calculations to determine water depletion, it should only be in the event that a mine is not discharging water or is discharging water unsuitable to the endangered Colorado River fish[1].** Water Depletion can be defined as any water that would have been available to the endangered fish in the Upper Colorado River that is not available as a result of mining activities. The following was created for compliance with the Colorado Endangered Fish Recovery Program.

Overview

These analyses are designed to simplify and standardize the methods for calculating water consumption. For that purpose, all consumption uses have been categorized into four main areas (listed below). It is understood that the water depletion estimates will vary for each mine site, but in general, water usage should be determined factoring in the following uses:

1 – Surface Dust Suppression

Includes: Haul road dust suppression.
Access road dust suppression.
Stockpile dust suppression.
Surface conveyor system sprays
Other dust suppression activities

2 – Surface Facility Demands

Includes: Bathhouse/office/mechanic shop consumption.
Domestic/potable water uses.
Preparation plants/processing/etc. consumption (if applicable)
Other civil water usage activities

3 – Surface Water Evaporation

Includes: Sediment pond evaporation.

4 – Underground Suppression and Production Demands

[1] The USFWS Salt Lake City field office will provide a guidance letter on what is considered water suitable for the endangered Colorado River fish.

Includes: Mining dust suppression.
Underground conveyor dust suppression
Bolting flushing

Surface Dust Suppression

Commonly, water that is used for surface dust suppression is attained through water rights, water pumped from streams/rivers, and alluvial aquifers (including deep level aquifers) that are connected to surface waters. If such is the case, the water used for surface dust suppression should be considered water depletion. Though details of the activities, which involve surface dust suppression may vary, the following calculations provide a simple and standard method to calculation the depletion.

A. Haul road/access road dust suppression calculations (SDS_1):

Calculating (SDS_1):

g_t = gallons / truckload
L_d = truckloads / day
d_y = days used / year

$SDS_1 = g_t * L_d * d_y$

Example:
g_t = 4000 gallons / truckload
L_d = 3 truckloads / day
d_y = 50 days used / year

$SDS_1 = g_t * L_d * d_y$
$SDS_1 = 4000 * 3 * 50$

SDS_1 = 600,000 gal/yr = 1.842 acre feet/yr

B. Stockpile dust suppression and surface conveyor system sprays (SDS_2):

Calculating (SDS_2):

g_{ss} = capacity for stockpile sprinkler (in gallons / hour)
g_{cs} = capacity for conveyor sprays (in gallons / hour)
t = hours used / day
d_y = days used / year

$SDS_2 = (g_{ss} + g_{cs}) * t * d_y$

Example:
g_{ss} = 200 gallons / hour
g_{cs} = 150 gallons / hour
t = 12 hours/day
d_y = 185 days used / year

$SDS_2 = (g_{ss} + g_{cs}) * t * d_y$
$SDS_2 = (200 + 150) * 12 * 185$

SDS_2 = 777,000 gal/yr = 2.385 acre feet/yr

C. Total water consumption from Surface Dust Suppression (SDS_T):

$SDS_T = SDS_1 + SDS_2$

Example:
$SDS_T = SDS_1 + SDS_2$
SDS_T = 600,000 gal/yr. + 777,000 gal/yr.

SDS_T = 1,377,000 gal/yr = 4.227 acre feet/yr

Surface Facility Demands

Commonly, water that is used for surface facility demands is also attained through water rights, water pumped from streams/rivers, and aquifers should be considered a water depletion. The following calculations provide a simple and standard method to calculation the depletion.

A. Bathhouse/office/mechanic shops/domestic & potable water consumption (SFD_1):

Calculating (SFD_1):

g_{pd} = gallons / day / person
p = number of persons using facility
d_y = days used / year

$SFD_1 = g_{pd} * p * d_y$

Example:
g_{pd} = 40 gallons / day / person
p = 350 persons
d_y = 360 days used / year

$SFD_1 = g_{pd} * p * d_y$
$SFD_1 = 40 * 350 * 300$

SFD_1 = 5,040,000 gal/yr = 15.472 acre feet/yr

B. Preparation plants/processing/etc. (SFD_2):

Calculating (SFD_2):

g_{sn} = capacity for spray nozzles (in gallons / hour)
t = hours used / day
d_y = days used / year

$SFD_2 = g_{sn} * t * d_y$

Example:
g_{sn} = 500 gallons / hour
t = 12 hours/day
d_y = 185 days used / year

$SFD_2 = g_{ss} * t * d_y$
$SFD_2 = 500 * 12 * 185$

SFD_2 = 1,110,000 gal/yr = 3.407 acre feet/yr

C. Total water consumption from Surface Facility Demands (SFD_T):

$SFD_T = SFD_1 + SFD_2$

Example:
$SFD_T = SFD_1 + SFD_2$
$SFD_T = 5{,}040{,}000$ gal/yr. + 1,110,000 gal/yr.

SFD_T = 6,150,000 gal/yr = 18.880 acre feet/yr

Surface Water Evaporation

Sediment ponds are used to accumulate precipitation runoff that flows over distributed areas. Once the sediment is accumulated and dropped out, the water discharges into a river or stream. Water that evaporates from sediment ponds should be considered water depletion.

The rate of evaporation of water depends on many factors. Scientific calculations for evaporation rates in large bodies of water require detailed psychrometric data, altitudes, wet and dry bulb temperatures, relative an specific humidity, enthalpy values, vapor pressures, partial ambient air pressures, specific volume, air specific weight, latent heat, air velocity, radiation heat gains, and thermal variance.

For a sediment pond, the amount of water that might be depleted is significantly less in relation to large water bodies that have extended holding periods; therefore, simplified methods for evaporation calculation can be utilized.

A. Sediment pond evaporation (SWE_T):

The simplified method of calculating evaporation of sediment pond water depends mainly on the differential between the vapor pressure of the water and the vapor pressure of the surrounding air, the surface area, and the speed of the air flowing over the water.

The amount of water evaporated from a body of water in contact with circulating air can be calculated with the following set of equations:

Calculating (SWE_T):

v = average velocity of air above the water surface (m/s)
k = (25 + 19 v) = evaporation coefficient (kg/m^{2}h)
A = water surface area (m^2)
xs = humidity ratio in saturated air at the same temperature as the water surface (kg/kg)
x = humidity ratio in the air (kg/kg)
$E = k * A * (xs - x)$
Solve for $E = (25+19v) * A * (xs - x)$ (amount of evaporated water (kg/h))

$SWE_T = 229.5 * E$ (amount of evaporated water (gal/yr))

Example:
v = 3.57(m/s)
k = (25 + 19 v) = 92.83 (kg/m^{2}h)
A = 20 (m^2)
xs = .3 (kg/kg)
x = .2 (kg/kg)

Solve for E: $= k A (xs - x)$ = (kg/h)
E: $= k A (xs - x)$ = (kg/h)
E: $= 92.3 * 20 * (.3 - .2) = 185.66$ (kg/h)

$SWE_T = 229.5 * E$ (amount of evaporated water (gal/yr))
$SWE_T = 229.5 * 185.66$

SWE_T = 42,608.97* gal/yr = *0.130 acre feet/yr

Underground Suppression and Production Demands

If water is present in an underground coal mine, it can be classified in one of the following categories:

Category 1) Water that has been attained through water rights and has been pumped into the mine from sources such as streams, rivers, or alluvial aquifers that are connected to surface waters.

Category 2) Water that entered the mine from an underground aquifer, or water from ancient water pockets or deep level aquifers.

All Category 1 water is assumed to be used for dust suppression on long-walls, continuous miners, conveyors, roadways, bolting purposes, etc. and is considered water depletion. **Any water that is evacuated from the mine by ventilation evaporation can be neglected due to the fact that all of the depletion would be accounted for in calculating the water used by the underground equipment.**

Category 2 water pumped from the mine may be used as mitigation for water depletion or a depletion offset.

The amount of water used by underground equipment can be calculated with the following set of equations:

A. Longwall Water Use (UGU_1):

Calculating (UGU_1):

g_{lw} = capacity for 1 longwall spray (in gallons / hour)
n_{lw} = number of longwall sprays
t = hours used / day
d_y = days used / year

$UGU_1 = g_{lw} * n_{lw} * t * d_y$

Example:
g_{lw} = 95 gallons / hour / spray
n_{lw} = 90 sprays
t = 20 hours / day
d_y = 275 days used / year

$UGU_1 = g_{lw} * n_{lw} * t * d_y$
$UGU_1 = 95 * 90 * 20 * 275$

UGU_1 = 47,025,000 gal/yr = 144.366 acre feet/yr

B. Continuous Miner (CM) Use (UGU_2):

Calculating (UGU_2):

g_{lw} = capacity for 1 CM spray (in gallons / hour)
n_{lw} = number of CM sprays
t = hours used / day
d_y = days used / year

$UGU_2 = g_{cm} * n_{cm} * t * d_y$

Example:
g_{cm} = 20 gallons / hour / spray
n_{cm} = 25 sprays
t = 20 hours / day
d_y = 300 days used / year

$UGU_2 = g_{cm} * n_{cm} * t * d_y$
$UGU_2 = 20 * 25 * 20 * 300$

UGU_2 = 3,000,000 gal/yr = 9.21 acre feet/yr

C. UG Conveyor Dust Suppression Use (UGU_3):

Calculating (UGU_3):

g_{ds} = capacity for 1 spray (in gallons / hour)
n_{gs} = number of sprays
t = hours used / day
d_y = days used / year

$UGU_3 = g_{ds} * n_{ds} * t * d_y$

Example:
g_{ds} = 20 gallons / hour / spray
n_{ds} = 150 sprays
t = 12 hours / day
d_y = 360 days used / year

$UGU_3 = g_{lw} * n_{lw} * t * d_y$
$UGU_3 = 20 * 150 * 12 * 360$

UGU_3 = 12,960,000 gal/yr = 39.787 acre feet/yr

D. Bolting Flushing Use (UGU_4):

Calculating (UGU_4):

g_{bf} = capacit (in gallons / hour)
t = hours used / day
d_y = days used / year

$UGU_4 = g_{bf} * t * d_y$

Example:
g_{bf} = 50 gallons / hour
t = 16 hours / day
d_y = 300 days used / year

$UGU_4 = g_{bf} * t * d_y$
$UGU_4 = 50 * 16 * 300$

UGU_4 = 240,000 gal/yr = 0.736 acre feet/yr

E. Total water consumption from Underground Usage (UGU_T):

$UGU_T = UGU_1 + UGU_2 + UGU_3 + UGU_4$

Example:
$UGU_T = UGU_1 + UGU_2 + UGU_3 + UGU_4$
UGU_T = 47,025,000gal/yr. + 3,000,000 gal/yr. + 12,960,000 gal/yr. + 240,000 gal/yr.

UGU_T = 63,225,000 gal/yr = 194.100 acre feet/yr

Summary Calculations

For each of the depletion categories defined in the Overview section of this analysis, depletions were calculated and totaled and the depletion offset water subtracted as follows:

Surface Dust Suppression = SDS_T = 1,377,000 gal/yr = 4.227 acre feet/yr
Surface Facility Demands = SFD_T = 6,150,000 gal/yr = 18.880 acre feet/yr
Surface Water Evaporation = SWE_T = 42,608.97 gal/yr = 0.130 acre feet/yr
UG Suppression and Production = UGU_T = 63,225,000 gal/yr = 194.100 acre feet/yr
Subtract any depletion offset water (must be based on actual discharge) = 0 acre feet/yr

Total Water Depletion = 217.337 acre feet/yr

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